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Journal of Molecular Biomarkers & Diagnosis

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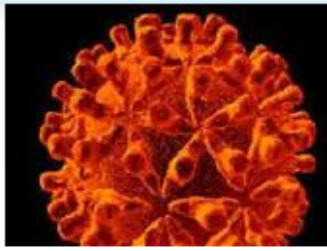

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Current Research area

- Vaccine-based cancer immunotherapy
  - Role of MUC1, a mucin that is over-expressed and aberrantly glycosylated in various types of cancer, in tumor progression, metastasis and modulation of the immune system
  - Characterization of MUC1 as a tumor vaccine

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Why MUC1?

- MUC1 is a heavily glycosylated transmembrane mucin that is expressed on the apical surface of glandular epithelial cells at low levels and at very high levels following transformation to cancerous cells
- Various types of cancer exhibit a striking over-expression and aberrant immature truncated O-glycosylation of MUC1
- The glycopeptide epitopes of aberrantly glycosylated MUC1 are susceptible to recognition by cytotoxic T lymphocytes and can also be bound by antibodies to mediate antibody-dependent cell-mediated cytotoxicity
- Earlier it was proved in our lab that immunization of mice with the glycosylated tripartite vaccine, composed of an immunoadjuvant (TLR2 agonist), a peptide T helper epitope and an aberrantly glycosylated MUC1 peptide, was able to reduce the tumor burden in mice

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Ongoing research..

- Determination of the role of MUC1 in cell adhesion, tumor progression, metastasis and modulation of the immune system.
- Characterization of tumor antigens as tumor vaccines.
- Elucidating the molecular and genetic mechanisms involved in the accumulation of truncated O-glycans in most of the epithelial cancer cells.
- Deciphering the role of cosmc, a chaperone required for O-glycan elongation, in decreasing tumor progression and metastasis by modulating the immune system.

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My research interest also includes:

- Elucidation of the molecular mechanisms involved in the pathogenesis of ulcerative colitis-associated local damage and extra-intestinal manifestations as well as colitis-associated colon carcinogenesis
- We provided the mechanistic association between colitis-induced local as well as global damage, *viz.*, hepatic and systemic damage and elucidated the role of gut bacteria therein
- We also studied the role of autophagy and Nrf2 signaling pathways in the progression of colitis-associated colon carcinogenesis

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- Pre-clinical toxicology (genotoxicity, carcinogenesis, hepatotoxicity, cardiotoxicity, nephrotoxicity, germ cell toxicity, reproductive toxicology)
- Pre-clinical drug development
- Molecular biology
- Molecular toxicology
- Regulatory toxicology
- Risk assessment
- Endocrine disruption

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- Advancements in Genetic Engineering
- Journal of Molecular and Genetic Medicine

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